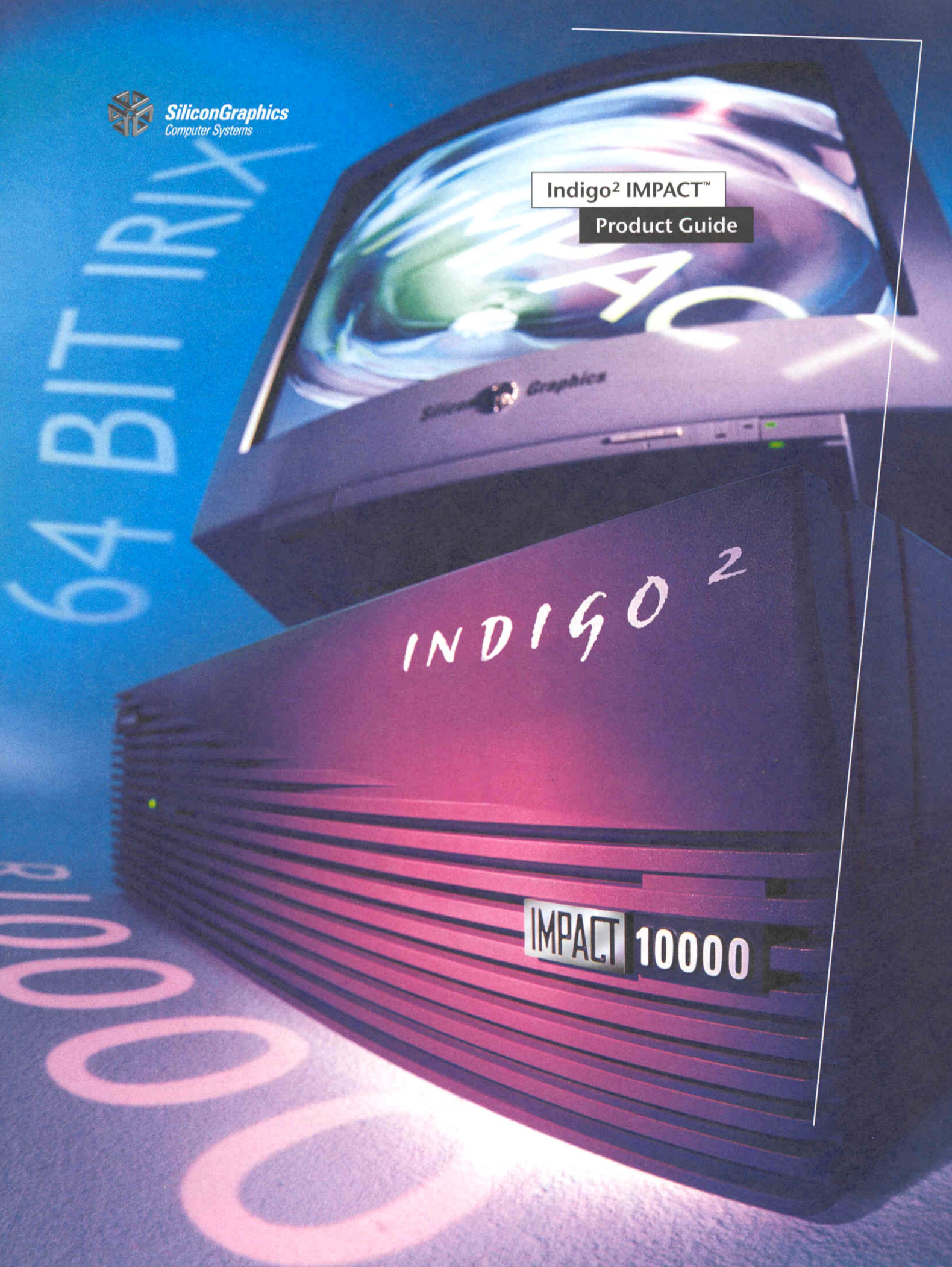

SiliconGraphics
Computer Systems
Indigo² IMPACT™
Product Guide
64 BIT IRIX
INDIGO²
IMPACT 10000

TECHNOLOGIES CONVERGE

The Indigo² IMPACT 10000 workstation marks the convergence of three powerful industry-transforming technologies that revolutionize desktop visual computing. No other desktop system fuses the fastest RISC microprocessors with the most interactive and realistic graphics in a true 64-bit software environment.

Indigo² IMPACT 10000 integrates the most advanced technology in the three key critical areas of a visual computing system: microprocessor, graphics, and operating system. For the first time, you have the computational power to tackle large problems, experiment with new options, and still meet your deadlines. The MIPS® R10000™ microprocessor leads the industry in performance for technical and creative computing tasks, from engineering analysis to final frame rendering. The Indigo² IMPACT 10000 graphics subsystem is unmatched in both raw 3D performance and features such as accelerated texture mapping and image processing that add realism to the model or scene. IRIX™ release 6.2, the industry's only desktop-to-data-center operating system, employs proven, standards-based 64-bit UNIX® to unleash the power of the system's 64-bit hardware architecture. Integrated digital media, including the engaging Indigo Magic™ user environment, completes the picture, giving the user unprecedented access and control of the power of Indigo² IMPACT 10000.

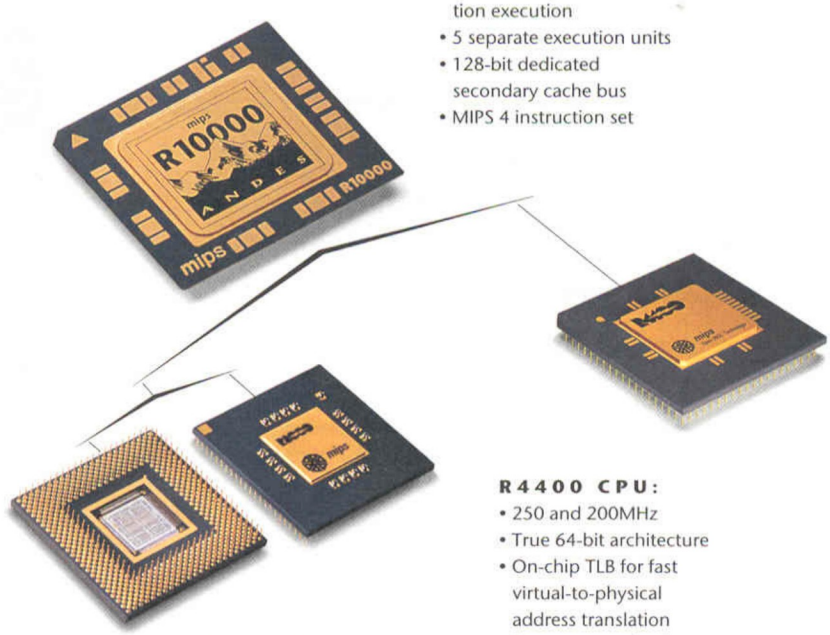
Each of the core technologies of Indigo² IMPACT 10000 represents a major milestone in the history of computing. Together, they enable breakthrough achievements in manufacturing, entertainment, and a host of other demanding applications and industries.

Explore new and dangerous worlds without leaving your office. Design, assemble, analyze, and test new products without machining a single part. Bring to life new characters and scenes that until now, you could only imagine. Whatever your vision, Indigo² IMPACT 10000 can help you conceptualize, innovate, and create in compelling new ways.

R10000—The New Computational Leader

The Indigo² IMPACT 10000 workstation features the new 64-bit MIPS R10000 processor, reaffirming the desktop performance leadership of Silicon Graphics. With out-of-order execution, large flexible caches, and superscalar design, R10000 brings top performance to real-world codes, delivering two- to three-times the application performance of previous processors. R10000 offers a combination of leading integer performance and supercomputer-class floating-point capabilities, enabling the integration of new applications on the desktop.

R10000 CPU:
- 4-way superscalar, 64-bit architecture
- Out-of-order instruction execution
- 5 separate execution units
- 128-bit dedicated secondary cache bus
- MIPS 4 instruction set



R4400 CPU:
- 250 and 200MHz
- True 64-bit architecture
- On-chip TLB for fast virtual-to-physical address translation
- 8-stage superpipeline architecture
- 2MB secondary cache

R8000 CPU:
- 75MHz
- 4-way superscalar 64-bit architecture
- 2MB global streaming cache
- Separate load/store buses
- 300 MFLOPS peak
- Dual FP execution units

A Family of Powerful Processors

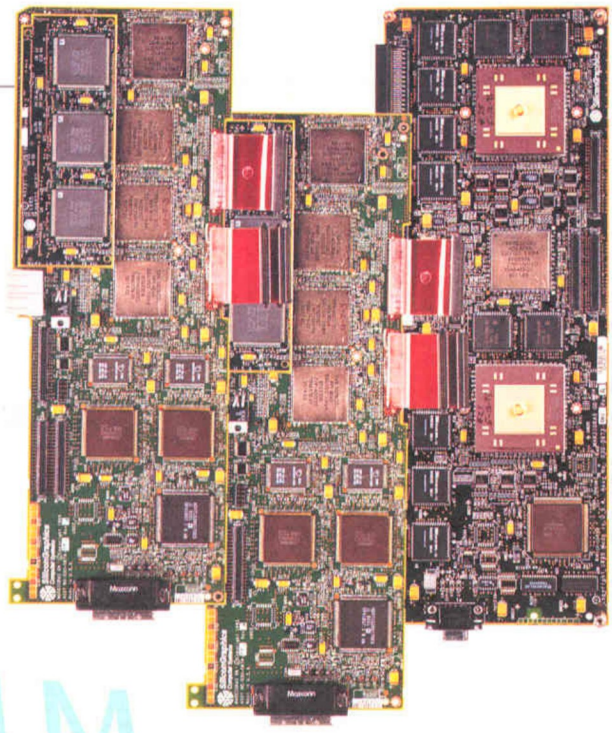
Indigo² IMPACT utilizes the leading MIPS R4400™ processor at a highly affordable price for balanced floating-point and integer computations. The POWER Indigo²™ workstation features the R8000® processor's dual floating-point execution units for Cray™ YMP-like performance at a fraction of the cost.

IRIX 6.2: Proven 64-Bit UNIX for High-Performance Visual Computing

IRIX 6.2 spans all Silicon Graphics® platforms from desktop to data center. This full 64-bit IRIX release, based on UNIX System V Release 4, provides end users with complete multimedia functionality through the Indigo Magic user environment. Extensive support for industry standards, coupled with Silicon Graphics innovations, mean that developers get the latest and best technologies for exceptional graphics, networking, and tuned filesystems. The highlights of IRIX 6.2 include:

- Full 64-bit implementation: allows complete utilization of the 64-bit hardware architecture of Indigo² IMPACT 10000 for maximum performance.
- 32-bit ABI compatibility: for preserving customers' software investments. Binary compatibility is maintained with IRIX 5 releases.
- Indigo Magic user environment: a rich, end-user desktop environment, bundled with multimedia and Internet tools, including Netscape Navigator™ and WebSpace™ 3D VRML Navigator.
- XFS™: a 64-bit journaled filesystem with integrated volume management and guaranteed-rate I/O. XFS supports files as large as 9 million TB, and filesystems as large as 18 million TB.
- Technology for applications development: premier tools for user interface and graphics development, including X11 Release 6, Enhanced Motif™ 1.2.4, and OpenGL®.

64-BIT IRIX



Maximize Your Impact

The Indigo² IMPACT family sets a new standard for desktop visualization with three leading graphics subsystems: Indigo² Maximum IMPACT™, Indigo² High IMPACT™ and Indigo² Solid IMPACT™. Indigo² IMPACT delivers unprecendented realism and outstanding interactivity, enabling users to create more complex and lifelike models and scenes, all with real-time response from the graphics system.

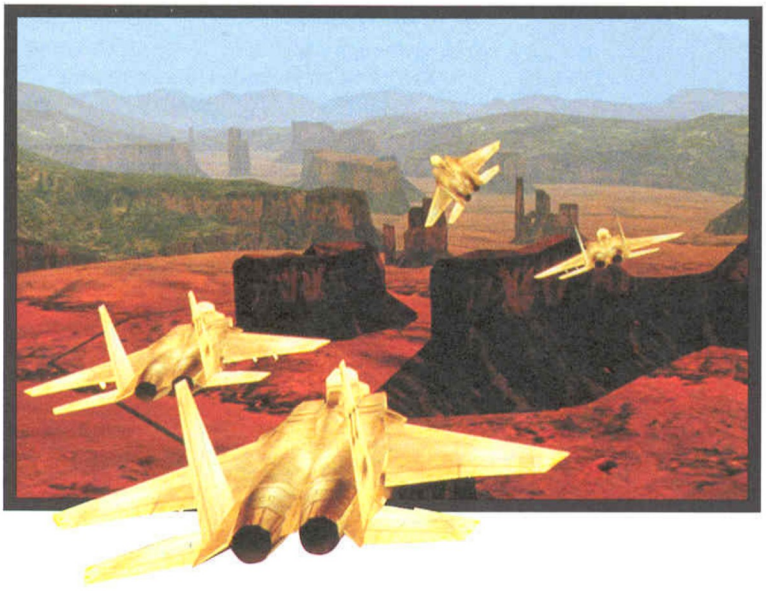
MAXIMUM

Indigo² Maximum IMPACT:

A New Level of Visual Computing

The flagship of the Indigo² IMPACT line, Indigo² Maximum IMPACT provides today's highest-performance textured 3D graphics and imaging capabilities on the desktop. The parallel graphics architecture and imaging subsystem allow you to combine compelling 3D solid models and 2D images.

The unmatched graphics features and performance of Indigo² Maximum IMPACT bring new applications to the desktop, such as enhanced industrial design, digital prototyping, interactive compositing, game prototyping, medical imaging, and visual simulation.



Indigo² Maximum IMPACT Features:

HQ3 Command Processor
- Distributes graphics primitives to Geometry Engine® and Image Engine processors
- 267MB/sec GIO64 bus interface
- Pixel DMA Engine
- 300,000 gates

Two GE11 Geometry and Image Engines
- Transforms 3D geometry
- Performs convolutions and other 2D imaging operations
- 960 MFLOPS total processing power
- 600,000 gates each

Two RE4 Raster Engines
- Enable high-performance pixel-fill
- 240M pixels/sec fill rate
- 300,000 gates each

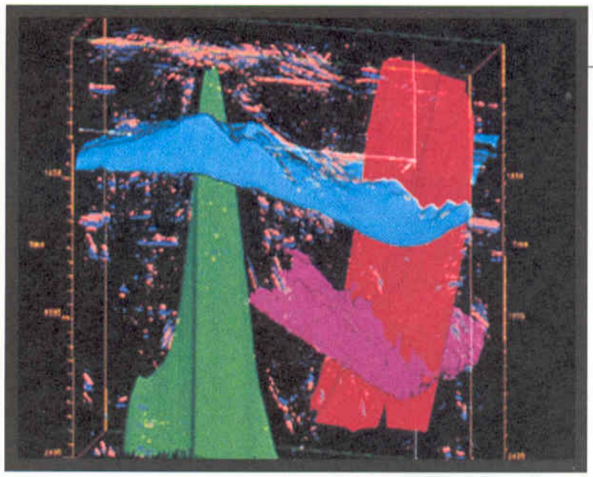
Four PP1 Pixel Pipe Processors
- Provide blending, depth, and dithering
- 295,000 gates each

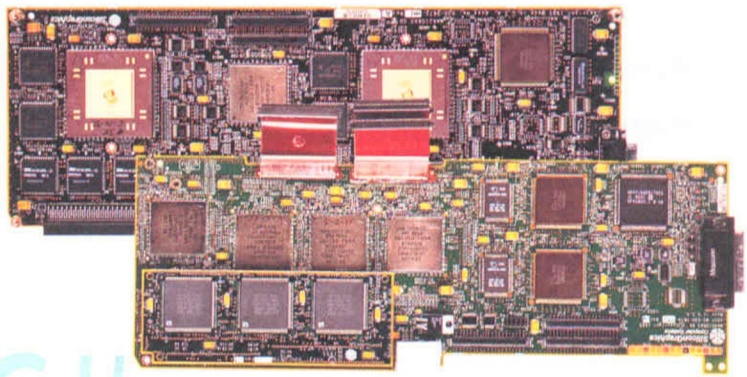
RDRAM Frame Buffer
- High-bandwidth configurable frame buffer
- 32-bit double buffer with 24-bit Z-buffer and 8-bit stencil at 1280x1024 resolution
- High-color resolution: up to 12-bits per component at 1280x1024 resolution
- Up to 1600x1200 screen resolution

Live Video
- Expansion port supports Indigo² Video™, Indigo² IMPACT Video, Indigo² IMPACT Channel Option, or Indigo² Presenter

Two TE Texture Engines
- Fill, warp, and zoom images/texture data
- 119M pixels/sec textured fill rate
- Fast texture load capability
- 295,000 gates each

1 or 4MB Texture Memory
- Interpolates image/texture data and performs MIP-mapping interpolation
- 1MB of texture memory expandable to 4MB through optional daughter card
- 60,000 gates and 8Mb DRAM for each MB





Indigo² High IMPACT:

Pervasive Textured 3D and Imaging

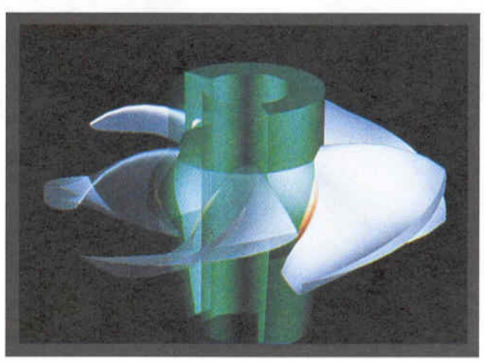
The most affordable desktop workstation to combine high-speed 3D graphics with fully integrated texture and imaging capabilities, Indigo² High IMPACT makes real-time image processing, true 3D volume rendering, and photo-realistic 3D graphics available for a broad range of applications such as 3D animation, GIS, seismic interpretation, and Web and game authoring.

Indigo² Solid IMPACT:

High-Performance Solid Modeling

Indigo² Solid IMPACT, the newest addition to the Indigo² IMPACT family, is the perfect fit for the new engineering mainstream. Designed for 3D solid modeling applications, Indigo² Solid IMPACT delivers excellent responsiveness with the fastest 3D geometry performance in its price class. Indigo² Solid IMPACT enables designers to manipulate complex 3D assemblies in real time, resulting in a more interactive design process.

Indigo² Solid IMPACT is based on the same scalable graphics as the rest of the Indigo² IMPACT family, including a native implementation of the industry-standard OpenGL 3D graphics API from Silicon Graphics. Indigo² Solid IMPACT is also easily upgradable to Indigo² High IMPACT and Indigo² Maximum IMPACT graphics.



Indigo² High IMPACT and Indigo² Solid IMPACT Features:

HQ3 Command Processor
- Distributes graphics primitives to Geometry Engine and Image Engine processors
- 267MB/sec GIO64 bus interface
- Pixel DMA Engine
- 300,000 gates

GE11 Geometry and Image Engine
- Transforms 3D geometry
- Performs convolutions and other 2D imaging operations
- 480 MFLOPS total processing power
- 600,000 gates

RE4 Raster Engine
- Enables high-performance pixel-fill
- 120M pixels/sec fill rate
- 300,000 gates

Two PP1 Pixel Pipe Processors
- Provide blending, depth, and dithering
- 295,000 gates each

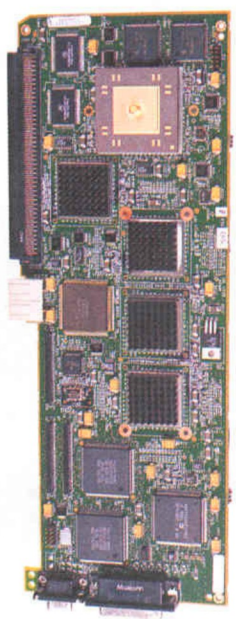
RDRAM Frame Buffer
- High-bandwidth configurable frame buffer
- 32-bit double buffer with 24-bit Z-buffer and 8-bit stencil at 1024x768 resolution
- Up to 1280x1024 screen resolution
- High color resolution: up to 12-bits per component at 1024x768 resolution

Live Video
- Expansion port supports Indigo² Video, Indigo² IMPACT Video, Indigo² IMPACT Channel Option, or Indigo² Presenter

Additional Features Available for Indigo² High IMPACT:

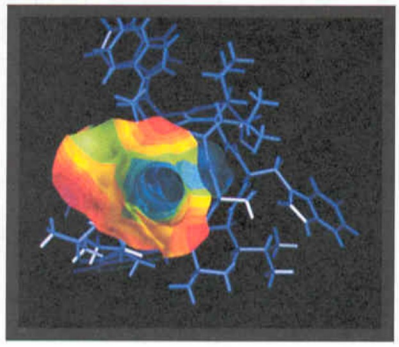
TE Texture Engine
- Fill, warp, and zoom images/texture data
- 295,000 gates
- 68.5M pixels/sec textured fill rate
- Fast texture load capability

1 or 4MB Texture Memory
- Interpolates image/texture data and performs MIP-mapping interpolation
- 1MB of texture memory expandable to 4MB through optional daughter card
- 60,000 gates and 8Mb DRAM for each MB



The Foundation of Choice

Indigo² IMPACT provides a superior processor, graphics, and operating system foundation for a diverse collection of high-volume software applications. From desktop supercomputing, CAT scan imaging, pilot training, and integrated design and analysis workstations to a desktop Hollywood studio, Indigo² IMPACT is the foundation of choice for state-of-the-art solutions.



Chemistry

Interactively create and explore complex molecular models and keep pace with the rapid expansion in chemical data—on the desktop.

VISUAL

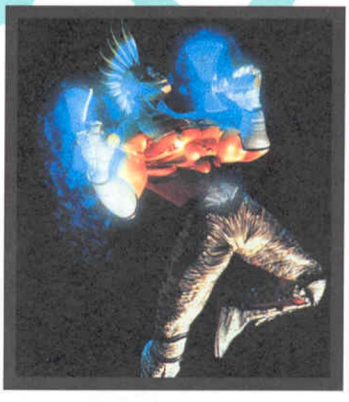
Post-Production

Combine 3D models with complex images, paint on a 3D object, watch realistic previews of animations and effects, process uncompressed video in real time, experiment with more ideas faster, and much more.

Medical Imaging

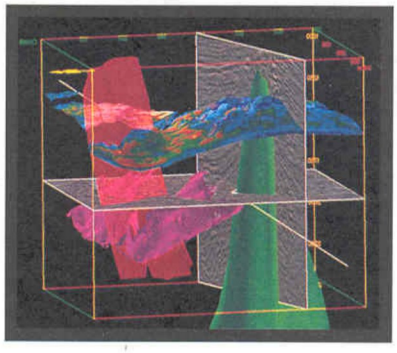
View and interact with 2D images and 3D volumes generated by CT, MRI, ultrasound, and other modalities.

SOL



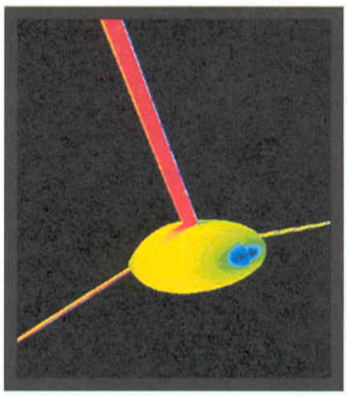
Games

Seamlessly host the entire game-development process. Enjoy the freedom to create compelling unmatched 3D visuals for the next generation of winning titles.



Oil and Gas

View large 3D volume datasets, integrate them with geological and engineering data, and generate accurate, easy-to-understand 3D earth models in real time.



Engineering Analysis

Use the computational power of Indigo² IMPACT 10000 to solve complex CFD, FEA, and crash-analysis problems. Use Indigo² IMPACT graphics to apply quantitative visual filters and rapidly focus on design hot spots.

CAD and Industrial Design

Build unparalleled 3D solid models with unmatched styling features, high-speed texturing, and pixel processing capabilities, utilizing the new economics of digital prototyping on the desktop.

Broadcast

Use the unique visualization and compute capabilities of Indigo² IMPACT to power solutions ranging from on-air graphics, television sports analysis, character generation, and weather graphics.

UTIONS

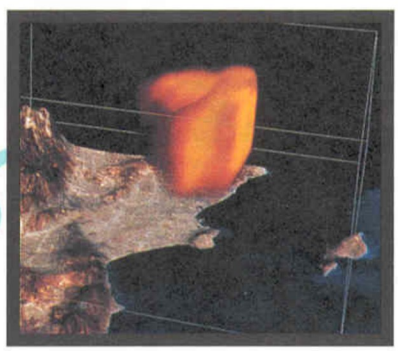
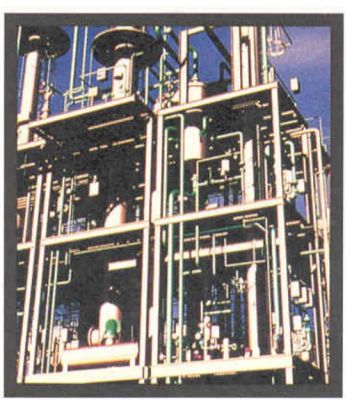


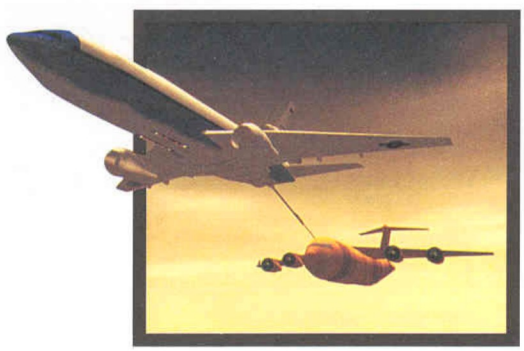
Image Processing

Create exciting images for electronic light table, photogrammetry, prepress, GIS, and C³1. Indigo² IMPACT provides special-purpose, dedicated image processing hardware performance in a general-purpose, commercial, off-the-shelf package.



AEC

Control, integrate, and visualize plant designs through the entire development cycle.



Visual Simulation

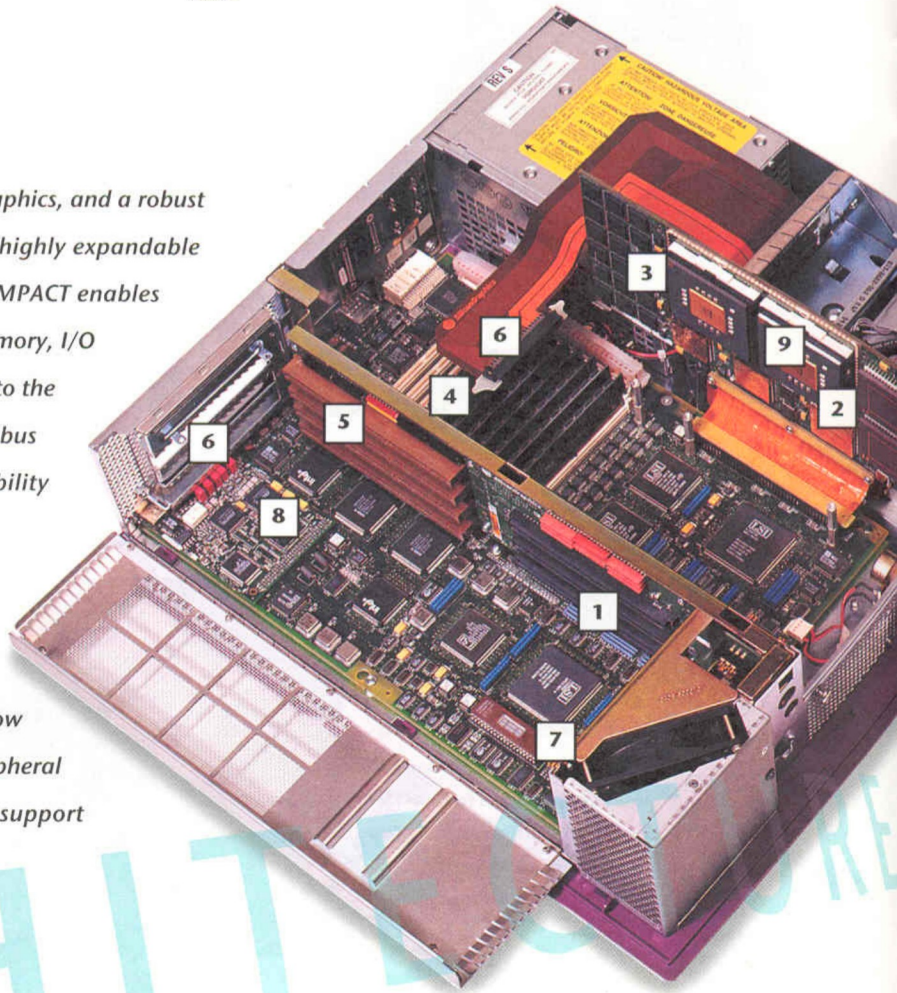
Create cost-effective real-time texture-mapped 3D graphics at unprecedented price points for training, simulation authoring, DIS, or mission planning.

1 High-Bandwidth Bus Architecture
High-speed 64-bit memory bus between the CPU and main memory runs at 400MB/sec while the 64-bit system bus runs at 267MB/sec

2 Upgradable High-Performance CPU
The processor module, which attaches to the baseboard, can be easily upgraded for higher performance

3 Large Cache for Maximum Application Performance
Increased performance through 32KB on-chip cache and up to 2MB secondary cache

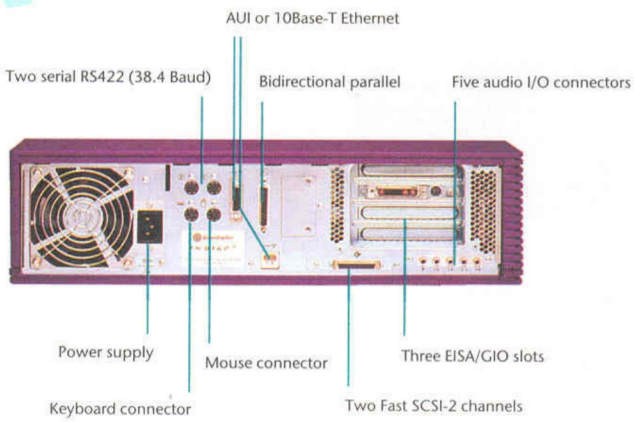
4 Memory Expansion
12 SIMM sockets for a maximum of 384MB RAM with R4400 and 640MB RAM with R10000 and R8000 processors



System Architecture and Expandability

Combining powerful processors, high-performance graphics, and a robust 64-bit operating system requires a high-bandwidth, highly expandable architecture. The 64-bit bus architecture of Indigo² IMPACT enables fast data transfer among the processor core, main memory, I/O systems, graphics systems, and any boards plugged into the GIO 64 expansion slots. Independent CPU and system bus clocks translate to maximum performance and flexibility when upgrading either processors or graphics. Built-in functionality includes memory expandability, Ethernet™ networking, two serial ports, a parallel port, and five audio connections. Two independent Fast SCSI-2 controllers and three internal SCSI bays allow Indigo² IMPACT to be configured with a variety of peripheral options, while multiple industry-standard EISA slots support your expandability requirements.

ARCHITECTURE



5 EISA Expandability
Three EISA slots shared with graphics (up to 33MB/sec transfer rate) for: ATM, FDDI, CDDI, 100Base-T Ethernet, second Ethernet, HiPPI, token ring, EISA-VME adapter, multi-serial port, shared memory ring, printer/plotter interface, and RAID adapter using Fast/Wide SCSI

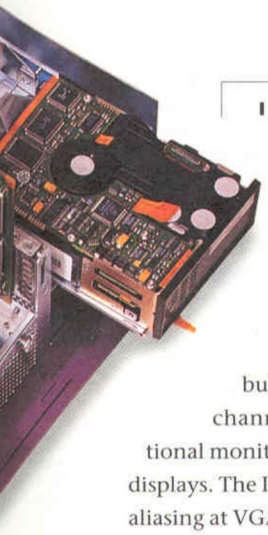
6 Two Fast SCSI-2 Channels
Support for a total of 10 SCSI devices for storage and I/O expansion. Three internal Fast SCSI-2 bays for hard disk, DAT, floppy, and CD-ROM drives

7 Built-In Networking
Ethernet, including both AUI and 10Base-T, supplied with every system

8 Integrated Digital Media
Up to four simultaneous input and output audio channels, plus an integrated video bus

9 Powerful MIPS RISC Processors
MIPS R10000, R8000, and R4400 64-bit RISC microprocessors

Indigo² IMPACT
Channel Option



Indigo² IMPACT Channel Option

The Indigo² IMPACT Channel Option (ICO) gives you multiple video output channels and head-mounted display (HMD) formats for applications involving visual simulation, entertainment, and virtual reality. ICO converts digital information stored in the Indigo² IMPACT graphics frame buffer into multiple analog video signals, or channels, which can then be displayed on additional monitors and projection devices or head-mounted displays. The ICO option card also supports full-scene antialiasing at VGA resolution for the highest-quality visuals.

Dual-Head Option

For applications that require additional screen space, the Indigo² IMPACT workstation supports a dual-head option. For programming flexibility, dual-head configurations support independent windows on each head for advanced data modeling and analysis applications. For example, one head can display a high-level view of the application data while the other head remains available for interactive analysis of the data. Both graphics heads support 24-bit color and hardware accelerated 3D geometry.

OPTIONS

Flat Panel Display

A 13-inch diagonal flat panel display, Presenter 1280 for Indigo² IMPACT features 1280x1024 pixel resolution, 18-bit true color and 24-bit color with frame rate modulation, sleep mode switch, and camera mount support. Also supported is a 12-inch diagonal flat panel display with 1024x768 pixel resolution, 12-bit true color, and 15-bit color with dithering between pixels. Both Presenter 1024 and 1280 have a digital display interface, custom backlight inverter, and presentation-quality audio. Presenter products are portable and perfect for walk-through design reviews with customers, team collaboration, and other interactive presentations.

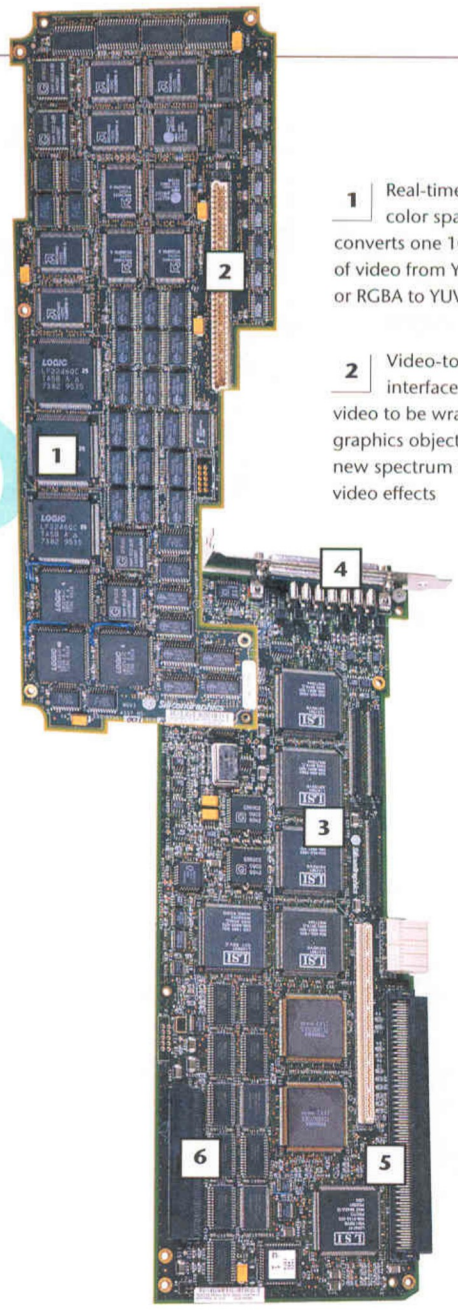
High-Resolution Monitor

Available either as an upgrade to the standard 20-inch monitor or as an extra display for Indigo² Maximum IMPACT graphics systems, the high-resolution monitor supports the display of virtually any output resolution or pixel timing from VGA to 1600x1200, including the standard high-resolution format of 1280 x1024 pixels at 60Hz non-interlaced refresh rates. Indigo² Maximum IMPACT supports resolutions and timing formats greater than 1280x1024 pixels (i.e. 1600x1200 pixels at 60Hz non-interlaced rates).

Digital Media for Everyone

Designed with digital media applications in mind, Indigo² IMPACT enables a wide range of solutions, from videoconferencing to professional broadcasts.

VIDEO



1 Real-time, high-quality color space converter converts one 10-bit stream of video from YUVA to RGBA or RGBA to YUVA

2 Video-to-texture interface allows live video to be wrapped on 3D graphics objects, creating a new spectrum of digital video effects

3 Keyer/Blender—allows you to capture graphics images and blend them with video in real time

4 Two 10-bit (CCIR601) inputs—two outputs, Genlock loop-through and GPI inputs

5 GIO Bus Interface—transfers two uncompressed streams of 601 video directly to memory in real time

6 Direct link to Indigo² IMPACT Compression allows two uncompressed streams to be received or sent to/from the compression card without utilizing GIO 64 bus bandwidth

Built-in Audio I/O

From basic audio I/O to professional CD/DAT quality levels, the standard features of Indigo² IMPACT can meet your requirements. Every Indigo² IMPACT system includes I/O capabilities for a microphone (one is supplied), headphones, line in and line out, and stereo digital I/O, all with sample rates configurable to 48KHz.

Indigo² Video Bundle

Combining video I/O capability with IndyCam™, Indigo² Video is the best solution for your team's collaborative efforts. In addition to sharing your ideas over the network, you can share your ideas on videotape, utilizing the print-to-video capability of Indigo² Video to send live graphics to any consumer VCR or camcorder.

Indigo² IMPACT Video

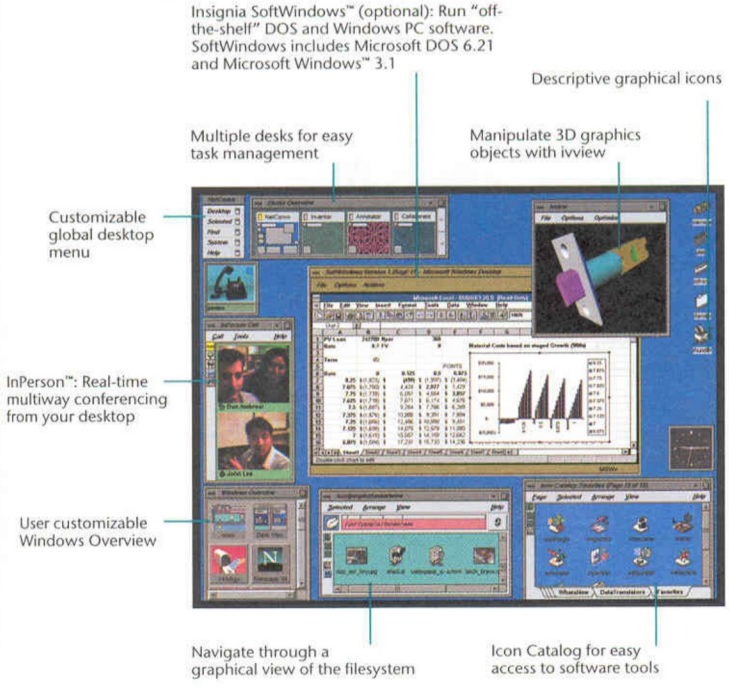
The Indigo² IMPACT Video family of products creates the ultimate solution for the video professional. The Indigo² IMPACT Video card (pictured) enables everything to be done in real time. Video can be moved in and out of the system in real time for rapid processing in paint, composite, and edit applications. Or, the power of Indigo² IMPACT graphics can be harnessed for real-time on-air applications. The optional CSC/texture interface card (pictured) allows users to perform high-quality color space conversion in real time, or to apply video as a texture onto any 3D object created in the graphics subsystem.

Indigo² IMPACT Compression

The Indigo² IMPACT Compression card can be used with Indigo² IMPACT Video to capture two streams of video and JPEG compression with ratios as low as 2:1 for very high image quality. This allows scientists, animators, and engineers to preview animations and simulations, or perform low-cost nonlinear editing. Video professionals can use the Indigo² IMPACT Compression card for time delay, spot playback, editing, and more. The Indigo² IMPACT Compression card also has analog video I/O ports, so it can be used as a stand-alone video I/O device.

Indigo Magic User Environment

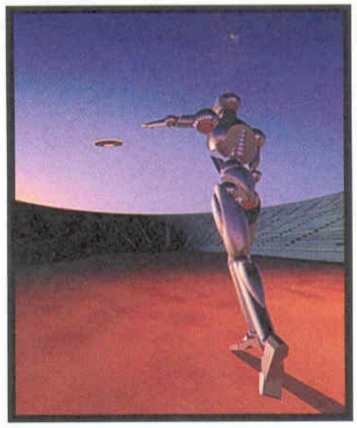
From desktop utilities to digital media applications and collaborative tools, Indigo Magic provides everything necessary for both the novice and the experienced user to take advantage of the power of visual computing. The intuitive, icon-based desktop environment makes Indigo² IMPACT easy to use, reduces training and support costs, simplifies system and network access, and facilitates collaborative computing.


Insignia SoftWindows™ (optional): Run "off-the-shelf" DOS and Windows PC software. SoftWindows includes Microsoft DOS 6.21 and Microsoft Windows™ 3.1
Descriptive graphical icons
Multiple desks for easy task management
Manipulate 3D graphics objects with ivview
Customizable global desktop menu
InPerson™: Real-time multiway conferencing from your desktop
User customizable Windows Overview
Navigate through a graphical view of the filesystem
Icon Catalog for easy access to software tools

WebFORCE™

The WebFORCE Indigo² IMPACT authoring station brings Indigo² IMPACT graphics and R4400 CPU technology to the World Wide Web. Use the WebFORCE authoring tools to create dazzling multimedia content. WebFORCE also provides an incredible combination of horsepower and advanced features for use with Virtual Reality Modeling Language (VRML) and WebSpace™ Navigator, the world's first commercially available 3D Web browser. VRML allows you to describe 3D data and create 3D worlds on the Web, and WebSpace provides an easy-to-use 3D navigation interface.

OpenGL



OpenGL is an industry-standard graphics development environment developed by Silicon Graphics and embraced by the industry's leading graphics vendors. OpenGL is a cross-platform portable API that enables 2D, 3D, and imaging applications to be developed once for deployment to a variety of hardware platforms with different operating systems and windowing environments. OpenGL includes operations for geometric and raster primitives, viewing and modeling transformations, lighting, shading, blending, fog, hidden surface removal, and texture mapping.

Open Inventor™

Open Inventor is an object-oriented 3D graphics toolkit that presents a programming model based on a 3D scene database. It provides a rich set of objects to speed up your development and extend 3D programming beyond OpenGL, X11, and Motif. The objects include cubes, polygons, text, camera, lights, trackballs, handle boxes, and 3D viewers and editors. Like OpenGL, Open Inventor is a cross-platform portable API.

IRIS Performer™

The IRIS Performer toolkit gives developers the means to achieve a fast consistent frame rate for applications in the areas of visual simulation, interactive entertainment, and simulation-based design. IRIS Performer has the intelligence to evaluate underlying hardware and optimize for best performance. Key benefits include simplified management of the visual database and maximum performance for scene rendering for all Silicon Graphics workstations.

ImageVision Library®

The ImageVision Library (IL) is an object-oriented extensible toolkit for creating, processing, managing, and displaying images on all Silicon Graphics workstations. ImageVision Library was designed to reduce complexity for the development of image processing applications with an API that remains portable despite hardware or OS changes. The core set of robust image processing functions includes color conversion, arithmetic functions, radiometric and geometric transforms, and edge, line, and spot detection.

Indigo2 IMPACT Technical Specifications

System

CPU/FPU	R4400	R4400	R10000
MHz	200MHz	250MHz	
Primary Cache (I/D)	16K/16K	16K/16K	32K/32K
Secondary Cache	2MB	2MB	1MB
Memory Storage	32MB to 384MB (R4400) 32MB to 640MB (R10000)		
I/O	2 3 1/2" bays 1 5 1/4" half-height bay 2 Serial RS422 (38.4k baud) 1 Bidirectional parallel 5 Audio I/O connectors 1 Ethernet (AUI or 10Base-T) 2 GIO-64 slots 3 EISA slots (shared with graphics)		
SCSI	2 SCSI-2 channels		

Graphics

Advanced Features	Alpha blending, accumulation buffer, anti-aliased RGB lines and points, texture mapping, fog, lighting features (spot lighting, eight light sources, two-sided lighting, ambient, diffused, and specular) arbitrary clipping planes, depth cueing, soft shadow and depth of field, sub-pixel positioning, stenciling, stereo graphics, pan and zoom, X11 pixel operations
Color Maps	1 (4,096 colors each)
IRIS GL™/OpenGL	RGBA quad buffer (stereo)
Display Modes	RGBA double buffer RGBA single buffer Color index double buffer Color index single buffer Color index overlay

* Available only on Indigo² IMPACT

Audio/Video

Input	Mono/Stereo microphone (mono electret condenser microphone ships standard) Line-level stereo analog Serial digital stereo (IEC958)
Output	Stereo headphone output/mono (combined stereo) internal speaker Line-level stereo analog Serial digital stereo (IEC958)
Sampling Rates	48, 44.1, 32KHz, and many lower rates Input and output rates are independent
Converters	Combined DAC and ADC 16-bit, delta-sigma, 64x-oversampling Two stereo audio codecs
Connectors	All 1/8-inch (3.5 mm) stereo jacks
Video/Compression	Options available on all Indigo² systems
Genlock	Available through video options

GRAPHICS BENCHMARKS

Viewperf Performance Results (frames/sec.)

	Indigo² Solid IMPACT	Indigo² High IMPACT	Indigo² Maximum IMPACT
CDRS Viewset Composite	18.29	25.38	44.67
Data Explorer Viewset Composite	7.36	7.36	9.33
Design Review Viewset Composite	4.08	4.93	5.41

Graphics Primitives

	Indigo² Solid IMPACT	Indigo² High IMPACT	Indigo² Maximum IMPACT
X Lines	3.26M	3.26M	3.26M
AA Depth cued (Fogged) Lines	1.28M	1.28M	1.85M
Gouraud Tri Strips*	1.25M	1.25M	2.2M
Lit Gouraud Z Tri Strips*	1.02M	1.02M	1.8M
Lit Textured Gouraud Z Tri Strips**	N/A	652k	1.16M
Lit Gouraud Z Independent Quads	384k	384k	676k
Gouraud Fill (pixels/s)	120M	120M	240M
Textured Gouraud Z Fill (pixels/s)	N/A	68.5M	119M
Convolutions 3x3 general (comps/s)	13.7M	13.7M	24.4M
Convolutions 5x5 general (comps/s)	6.0M	6.0M	10.5M
Color lookups (comps/s)	20.8M	20.8M	36.6M

NOTE: *25 Pixel Triangles, **50 Pixel Triangles

Processor Benchmarks

	R4400/200	R4400/250	R10000
AIM	140	160	N/A
SPEC 92int	140	176	N/A
SPEC 92fp	131	165	N/A
SPEC int95*	N/A	N/A	8.9
SPEC fp95*	N/A	N/A	12.5
SPECint_base95*	N/A	N/A	8.2
SPECfp_base95*	N/A	N/A	11.5
LINPACK 1000x1000DP	58.7	87.1	N/A

*Estimated

Bundled Software: Desktop Special Edition

	InPerson™, WebMagic™, WebSpace Navigator, Showcase™, MediaMail™, Mindshare™ OutBox, Adobe Acrobat™, Netscape Navigator
WebFORCE™	Adobe Photoshop™, Adobe Illustrator™, WebMagic Author Pro, WebSpace Author, Media Magic (MPEG/Cinepak®), Insignia SoftWindows

Physical Environment

System	5" H x 18.5" W x 18.5" D; 40 lbs.
19-inch Monitor	18.7" H x 18.9" W x 19.9" D; 71.6 lbs.
Power Requirements	Voltage and Frequency; 100-120/200-240 VAC
Heat Dissipation	1320 BTU/hour (Indigo² IMPACT) 1000 BTU/hour (Indigo² XZ/XL)
Ambient Temperature	+ 13 to + 35 degrees C operating - 10 to + 65 degrees C non-operating
Relative Humidity	10% to 80% operating no condensation 10% to 95% non-operating no condensation
Altitude	10,000' operating; 40,000' non-operating
Vibration	0.02", 5-19Hz; 0.35 G, 19-500Hz

Regulatory Agency Approvals

Electromagnetic Emission	FCC Class A Canada DOC Class A CISPR 22 Class B Germany VDE Class B VCCI Class 2	Product Safety	EN55022 Class B UL 1950 CSA 22.2, No. 950 IEC 950 EN 60950 Class 1 SELV

ICO Output Formats

Resolution	Timing	Number of Channels
640 x 486 Interlaced	Component NTSC/RS-170 (RGB)	4
640 x 480 Non-Interlaced	VGA Field Sequential VGA (Full scene anti-aliasing)	4 2 1
800 x 486 Interlaced	RS170-Field sequential RS170-Field parallel component	2 2
800 x 600 Non-Interlaced	SVGA	2*
875 x 808 Interlaced	Field sequential	2*
1025 x 946 Interlaced	Field sequential	2*

*These models only supported on Indigo² Maximum IMPACT

MIPS RISC CERTIFIED POWER

SiliconGraphics Computer Systems

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Silicon Graphics World Wide Web Server
URL: http://www.sgi.com

Indigo² IMPACT Home Page
URL: http://www.sgi.com/Products/Indigo2/IMPACT

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